abscessation, ischemia, fibrosis, and neoplastic infiltration (1). Hypothyroidism has also been associated with complete heart block. Idiopathic fibrosis of older dogs, especially Cocker Spaniels, has also been reported as causing third degree heart block (1). And finally a number of drugs may induce third degree heart block, including digitalis, beta adrenergic blockers, calcium channel blockers, and xylazine (2).

Permanent pacemaker therapy is the most effective means of managing third degree heart block

Therapy for third degree heart block may involve parasympatholytic therapy such as atropine. Atropine therapy may convert an individual from third degree heart block to second degree heart block and thereby relieve symptoms of reduced cardiac output. In most cases, either atropine therapy fails to remedy the third degree heart block or provides extremely transient abolition of third degree heart block (up to 15 minutes of relief). Catecholamine therapy, especially isoproterenol, is useful to enhance the ventricular rate. In that the most effective form of isoproterenol therapy is via the intravenous route, this drug is useful primarily for short-term therapy (several days) until a permanent pacemaker can be implanted. Permanent pacemaker therapy is the most effective means of managing third degree heart block. This dog responded very well to pacemaker therapy.

Although pacemaker therapy effectively normalizes the ventricular rate it does little to address the underlying etiology of the third degree heart block. Consequently, continued efforts are indicated to attempt to establish the etiology of this conduction disorder such that progression of the disease process might be arrested.

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ANIMAL BEHAVIOR

COMPORTEMENT ANIMAL

Coprophagia: Food for Thought

Donal McKeown, Andrew Luescher and Mary Machum

Although some people can tolerate their dogs engaging in coprophagia, it is an extremely distressing behavior for most dog owners. The fact that it is seldom a health hazard is of little consolation to the person whose pet engages in this repugnant activity.

Although it is a common problem, little research has been done on the causes of coprophagia in dogs. Our clinical impression is that there is a genetic susceptibility to the behavior which is more likely to be expressed by certain lines and breeds of dogs. The predisposition is generally first expressed between 4–10 months of age, and the activity tends to decrease in intensity after one yer. There is, however, great individual variation. Some dogs outgrow the behavior, others partake only in the winter (Poopsicles are a particular delicacy), some indulge occasionally, and others never kick the habit.

Coprophagia in dogs has been related to experimentally induced thiamine deficiencies (1). However, this deficiency must be extremely severe, a situation seldom seen in practice. Chronic pancreatic deficiency, malabsorbtion syndrome, and starvation may also cause stool eating (2). It is thought that these disease states result in a large amount of undigested food being passed in the stool. The drive to eat stool is enhanced by both the increased nutritional value of the stool and by the increased appetite resulting from poor absorption. It must be emphasized that these disease states must be extremely advanced before they stimulate a desire to eat stool. Nevertheless, in some cases, the addition of small amounts of pancreatic enzymes to the diet eliminates the behavior. "Forbid", a commercial product containing these enzymes may be useful. It is thought that this food additive reduces the palatability of the stool (3).

Although many pet owners attribute their dog's coprophagia to boredom, the cause should more appropriately be identified as anxiety due to environmental conflict. Environmental stress can contribute to a variety of redirected behaviors, including coprophagia (4). However, we have been unable to

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identify this as a common cause of stool eating.

Stool eating can be an attention-getting act conditioned by the owner's reaction (5). It may also contain elements of play, and the stool itself appears to be rewarding. All of these components make it a difficult behavior problem to correct. The following case study illustrates this point.

"Freddie" is a 10-month-old, neutered male, white Miniature Poodle. The owners used to think he was the most wonderful dog in the world. However, about three months ago, they noticed that Freddie was eating something in the backyard. Concerned that he might have gotten into garbage, they rushed out to check. They were horrified to find his mouth full of feces. Overwhelmed with disgust, they disciplined him, then took him into the house, thoroughly cleaned his mouth and face, (telling him he was a bad dog throughout the process) and put him back out into the yard. Their disgust knew no bounds when Freddie calmly began munching again! This behavior is a major problem for them, and as they have three young children they do not feel that they can ignore the stool eating or prevent the dog from licking the children's faces.

Before seeking assistance in dealing with the problem, the owners tried a number of popular remedies. They made the stool aversive by treating it with tabasco sauce, red pepper, and Chinese hot pepper. This approach is rarely successful, and in many cases makes the problem worse. If the dog occasionally manages to eat an undoctored stool, he is thus intermittently rewarded for the behavior, making it that much more resistant to extinction.

They also tried adding Certs to Freddie's food. This product is rumored to make the stool taste bad, but it is seldom effective. However, it does have other beneficial effects!

They tried to prevent access to the stool. It is difficult to keep the yard 100% clean, and in this case Freddie often tried to eat the stool immediately after defecating. Allowing Freddie out only on a leash was successful in preventing the behavior, but the owners were not happy at the prospect of supervising every second he spent in the yard for several months. They tried muzzling Freddie whenever he was alone in the yard. Although he could not eat the stool, he often came in with feces smeared on the end of the muzzle, which, to them, was almost as bad.

The owners, in great frustration, resorted to physical punishment. Predictably, it did not stop the behavior, and resulted in submissive urination.

Although some of the above suggestions have worked on other dogs, Freddie was particularly resistant to correction, primarily because his owners were not totally committed to the treatment plan. The underlying principle in the correction of any behavior problem is that once training commences, the dog should never again be allowed to perform the unwanted behavior. With coprophagia, this means that the owners must prevent all access to stool. A comfortable muzzle, used every time the dog is alone outside, is a valuable tool for temporarily interrupting the behavior, hastening the resolution of the problem. Other methods may involve keeping the dog on a leash, or training the dog to defecate on command. It is also possible to train the dog to return to the house as soon as he has defecated. However, all these approaches require a great deal of owner commitment.

The dog should be fed a consistent, good quality diet, high in fat and protein and low in carbohydrate, with no treats or scraps. Diets high in carbohydrate tend to enhance the drive to eat stool. The dry food component of the diet should be reduced and replaced with a high protein food. Although dry food is generally a good diet, it has been shown clinically that the above diet change will often lessen the drive to eat stool. The addition of vegetable oil (increased slowly over 7 days, to 15 mL/4.5 kg of body weight/day) is also helpful. Sufficient food should be given twice daily, on a regular schedule. Adding the fat and feeding twice a day helps suppress the appetite for a longer period, reducing this particular stimulus for stool eating. Often, a diet change, maintained for 4–8 weeks, may be all that is required to stop the behavior, in conjunction with the decreasing strength of the drive as the animal ages.

Freddie was an extremely unusual case in that none of the above approaches worked (except preventing access, which the owners were not prepared to do for the required time). Freddie's owners were seriously considering euthanasia, and in a last ditch attempt to save Freddie's life, the consistency of the stool was altered. Mouth feel is the major component of palatability for the dog. This approach was successful, and although there is great individual variation in the length of time a soft stool must be maintained, it is worth consideration.

Due to the lack of information and research in this area, there are no definitive treatments for dealing with coprophagia. However, various combinations of the above suggestions generally result in a satisfactory resolution to the problem. In dealing with stool eating, the veterinarian must be extremely aware of the owner's sensitivities on the subject. Some people are able to deal with the problem, and do not allow it to interfere with their enjoyment of their pet. Others, however, find it so disgusting that the bond with their dog is irreparably damaged. In these cases, euthanasia is an alternative which may have to be considered.

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